Citation:

Alewaeters K, Clarys P, Hebbelinck M, Deriemaeker P, Clarys JP. Cross-sectional analysis of BMI and some lifestyle variables in Flemish vegetarians compared with non-vegetarians. *Ergonomics.* 2005 Sep 15-Nov 15; 48(11-14): 1,433-1,444.

PubMed ID: 16338711

Study Design:

Cross-Sectional Study

Class:

D - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To examine body mass index (BMI), smoking and drinking habits, engagement in physical activity, medication use and subjective health perception in a vegetarian population.

Inclusion Criteria:

Vegetarian group:

- Vegetarian for at least one year
- At least 20 years of age.

Exclusion Criteria:

Fish-eaters were excluded from the vegetarian group.

Description of Study Protocol:

Recruitment

Subjects were recruited in the Flemish region of Belgium through advertising in health food stores, in publications and on Websites of vegetarian and animal rights associations, and through word of mouth.

Design

- Cross-sectional study
- Responses from 326 vegetarians were compared to the results from a survey of a

representative sample of the Belgian population (N=9,659) conducted by the Belgian government.

Dietary Intake/Dietary Assessment Methodology

- Self-administered questionnaire consisted of general questions on socio-economic characteristics, medical history, current smoking and drinking habits, physical activity and nutrition. Most of the items were taken from the National Health Survey, a validated instrument used to estimate health-related issues in the Belgian population every five years
- Information on physical activity was collected using a questionnaire.

Statistical Analysis

- All values were calculated separately for men and women. Comparisons between vegetarians and non-vegetarians were made by age group. The results of the vegetarians were compared with the results of a recent health survey of a representative sample of the Belgian population, held by the Belgian government
- BMI were compared using an independent samples T-test, and a non-parametric two-independent samples test was used to compare tobacco and alcohol consumption, perception of health status, physical activity level and medication use
- Significance level was set at 0.05.

Data Collection Summary:

Timing of Measurements

- Cross-sectional survey of vegetarians
- National Health Survey of general Belgian population conducted every five years.

Dependent Variables

- BMI
- Smoking status
- Drinking habits
- Engagement in physical activity
- Medication use
- Subjective health perception.

Independent Variables

- Vegetarian status (ovo-vegetarians, lacto-vegetarians and vegans)
- Non-vegetarian status.

Description of Actual Data Sample:

- *Initial N:* Vegetarian group, 650
- Attr*ition (final N):*
    - Vegetarians:
        - Females, N=206
        - Males, N=120
    - Reference group:

- Females, N=4,993
- Males, N=4,666

- *Age:*
  - Vegetarians:
    - Females (N=206), mean age 37±12.2 years
    - Males (N=120), mean age 42.3±15.9 years
  - Reference group:
    - Females (N=4,993), mean age 49.8±18.0 years
    - Males (N=4,666), mean age 48.0±17.1 year
- *Location:* Belgium.

Summary of Results:

Key Findings

- Vegetarians were 79.8% lacto-ovo-vegetarians, 1.8% ovo-vegetarians, 2.1% lacto-vegetarians and 15% vegans
- Vegetarians had a lower mean BMI compared to the reference population. The BMI of female vegetarians was significantly lower than the reference female Belgian population [mean (SD) = 22.1 (3.1) and 24.6 (4.8) kg/m^2, respectively]. Similarly, the BMI of male vegetarians was significantly lower than the reference male Belgian population [mean (SD) = 22.6 (3.6) and 25.7 (4.0) kg/m^2, respectively).

	Men		Women	
	Vegetarian Group (N=120)	**Reference Group (N=4,666)**	**Vegetarian Group (N=206)**	**Reference Group (N=4,993)**
Age at recruitment (years)				
Mean ± SD (median)	42.3±15.9 (38)	48.0±17.1 (46)	37.0±12.3 (34)	49.8±18.0 (47)
BMI ± SD	22.6±3.6	25.7±4.0	22.1±3.1	24.6±4.8
Alcohol consumers				
Week	33.3%	41.9%	32.5%	28.9%
Weekend	58.3%	75.4%	58.7%	64.1%
Tobacco Use				
Current smoker	15.8%	33.7%	12.1%	23.6%
Physical activity				
More than four hours a week	42.5%	18.6%	33.5%	9.0%
Less than four hours a week	24.2%	42.8%	30.6%	45.9%
Sedentary	33.3%	29.0%	35.9%	38.3%

Subjective perception of health				
Good to very good	94.8%	79.6%	87.9%	74.9%
Fair to very bad	5.2%	20.4%	12.1%	25.1%

Author Conclusion:

Vegetarians had a lower mean BMI, smoked less and were engaged in intensive physical activity compared with the reference population.

Reviewer Comments:

None.

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions

1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes

2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	???
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	???
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	No
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	???
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	???
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	N/A
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	N/A
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	N/A

5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	N/A
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	N/A
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	N/A
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	N/A
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	N/A
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	No

7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	No
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes
10.1.	Were sources of funding and investigators' affiliations described?	No
10.2.	Was the study free from apparent conflict of interest?	Yes